

Claims

We claim:

1. A reflector antenna, comprising:
 - a reflector; and
 - a feed assembly centrally mounted on the reflector; the feed assembly having a hub from which a waveguide extends; a distal end of the waveguide flaring into a dielectric cone which couples with a sub reflector at a periphery of the sub reflector.
2. The antenna of claim 1, wherein the hub, the waveguide and the sub reflector are ultrasonically welded into a single integral component.
3. The antenna of claim 1, wherein an internal surface of the waveguide, except the dielectric cone, and a bottom surface of the sub reflector are coated with a conductive material.
4. The antenna of claim 3, wherein the conductive material is one of copper, silver and gold.
5. The antenna of claim 3, wherein the waveguide exhibits a soft boundary characteristic adjacent the surface coating.
6. The antenna of claim 1, further including a radial choke formed in a side edge of the sub reflector.

7. The antenna of claim 6, wherein the radial choke is formed in a plate coupled to the sub reflector.
8. The antenna of claim 1, wherein the sub reflector has a conical reflecting surface projecting towards the distal end of the waveguide and a plurality of corrugations between an outside edge of the conical reflecting surface and the periphery of the sub reflector.
9. A feed assembly for a reflector antenna, comprising:
 - a waveguide coupled at a proximal end to a hub;
 - the waveguide flaring into a dielectric cone at a distal end;
 - the cone extending from a waveguide diameter to a sub reflector diameter;
 - and
 - a sub reflector coupled to the cone along a periphery of the sub reflector.
10. The apparatus of claim 9, wherein the waveguide is ultrasonically welded to the hub and the sub reflector is ultrasonically welded to the dielectric cone.
11. The apparatus of claim 9, wherein the interior surface of the waveguide, except the dielectric cone, and a bottom surface of the sub reflector is surface coated with a conductive material.

12. The apparatus of claim 11, wherein the conductive material is one of copper, silver and gold.

13. The apparatus of claim 9, wherein the sub reflector has a conical reflecting surface projecting towards the distal end of the waveguide and a plurality of corrugations between the conical reflecting surface and the periphery of the sub reflector.

14. The apparatus of claim 13, further including a radial choke formed in a side edge of the sub reflector.

15. A method for manufacturing a feed assembly for a reflector antenna, comprising the steps of:

- injection molding a waveguide having a dielectric cone at a distal end;
- injection molding a sub reflector;
- coating an interior surface of the waveguide, except the dielectric cone, and a bottom surface of the sub reflector with a conductive material; and
- ultrasonically welding the sub reflector to a distal end of the dielectric cone.

16. The method of claim 15, further including the steps of:

- injection molding a hub; and
- ultrasonically welding a proximal end of the waveguide to the hub.

17. The method of claim 15, further including the step of coating a bottom surface of the hub with a conductive material.
18. The method of claim 15, further including the step of forming a radial choke in a periphery of the sub reflector.
19. The method of claim 18, wherein the radial choke is formed in a plate which is coupled to a top side of the sub reflector.
20. A feed assembly for a reflector antenna, comprising:
 - a waveguide with a proximal end and a distal end,
 - the waveguide formed out of a dielectric material coated with a conductive material on an internal surface;
 - a dielectric cone extending from a waveguide radius at the distal end of the waveguide to a larger sub reflector radius; and
 - a sub reflector coupled to the sub reflector radius of the dielectric cone.
21. The assembly of claim 20, further including a conical reflecting surface on the sub reflector projecting towards the distal end, the conical reflecting surface surrounded by a plurality of corrugations.
22. The assembly of claim 20, further including a hub coupled to the proximal end of the waveguide.

23. The assembly of claim 20, further including a radial choke formed along a side edge of the sub reflector.

24. The assembly of claim 20, further including a plate having a side edge with a radial choke; the plate coupled to a top side of the sub reflector.

25. The assembly of claim 20, wherein the waveguide and the cone are formed as a contiguous piece of dielectric material.

26. The assembly of claim 20, wherein the sub reflector is formed out of a dielectric material coated on a bottom surface with a conductive material.

27. The assembly of claim 20 wherein the sub reflector is attached to the sub reflector radius along a periphery of the sub reflector.

28. A reflector antenna, comprising:
a dish shaped reflector coupled to a feed assembly proximate a vertex area of the reflector;
the feed assembly having a waveguide with a dielectric outer surface.